1885MNRAS..45..303D

Although the range of discordances in R.A. depending on N.P.D. is somewhat increased for the 1880 Catalogue by this proceeding, it still shows its superiority to the 1850 Catalogue. The extreme range for the former being from $-0^{s}\cdot044$ at N.P.D. 120° to $+0^{s}\cdot048$ at N.P.D. 150°, and for the latter from $-0^{s}\cdot006$ at N.P.D. 100° to $+0^{s}\cdot143$ at N.P.D. 140°. It appears, therefore, that, as far as this evidence goes, errors in the R.A.'s of the Cape Catalogue for 1850 are the principal cause of the discordances in R.A. depending on N.P.D. which appear in the comparison of the R.A.'s of the Cape Catalogues for 1850 and 1880.

Attention may also be called to the discordances between the R.A.'s of the 1840 and 1850 Catalogues when the same instrument was used; and also to the discordances between the R.A.'s of the 1860 and 1880 Catalogues, where again the same instrument was used. It would appear, therefore, that the discordances between the 1850 and 1880 Catalogues are not necessarily due to any cause arising from the use of a different instrument in making the observations.

It may be remarked that the discordances in R.A. given in this paper throughout are the actual discordances at the respective N.P.D.'s, without reduction to the equator.

On the Star Places of the Nautical Almanac.

By A. M. W. Downing, M.A.

In the *Nautical Almanac* for 1884 a change is introduced in the sources from whence the places of the Greenwich fundamental stars are taken. The mean Right Ascensions of 182 * stars have been derived (as we are informed in the Preface to the *Nautical Almanac* for 1884) from (1) the table, pp. 21–22, of the Greenwich Nine-Year Catalogue; (2) the Greenwich Clock-star List for 1879; (3) the Nine-Year Catalogue itself. The mean Declinations have been brought up from the Nine-Year Catalogue, including the corrections of table, p. 27. It appears, therefore, that the Right Ascensions of those stars which are used as clock stars at Greenwich are derived from the standard Right Ascensions of clock stars from 12-hour groups observed during the years 1868–1876, and the Right Ascensions of the remaining *Nautical Almanac* stars are taken from the Nine-Year Catalogue itself. Also that the Declinations of the *Nautical Almanac* are those of the Nine-Year Catalogue corrected so as to depend on the refractions of Bessel's *Tabulæ Regiomontanæ*, with the corresponding value of the latitude of Greenwich. In the *Nautical Almanac* for 1883 the mean places of the Greenwich standard

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* Mr. Hind informs me that from 1880 onwards, the place of *α Columbæ* has been derived from the Cape and Melbourne Catalogues. This reduces the total number of stars whose places are taken from the Greenwich Catalogues to 182.

1885MNRAS..45..303D

stars are derived from the Greenwich Catalogues for 1860 and 1864. In this paper I propose to discuss the systematic differences between the places of the *Nautical Almanac* stars as given in the *Nautical Almanacs* for 1883 and 1884, consequent on the change from the Seven-Year Catalogues to the Nine-Year Catalogue, confining myself to the case of those stars whose places are derived from the Greenwich Observations. The places of the stars as given in the *Nautical Almanac* for 1883 have been brought up to 1884 by applying the annual variations, and the differences taken. The stars have then been arranged in order of Declination, and the following table exhibits, in this order, the differences *Nautical Almanac* 1883—*Nautical Almanac* 1884 for the individual stars.

Name of Star.	Approx. Dec.	Δα	Δδ
	° ′	s	″
λ Ursæ Min.	+88 57	+2·040	+0·14
α Ursæ Min.	88 41	−0·088	−0·06
Cephei 51 (Hev.)	87 13	+0·775	−0·48
δ Ursæ Min.	86 36	+0·696	−0·46
ε Ursæ Min.	82 14	+0·008	+0·34
ζ Ursæ Min.	78 9	+0·365	−1·23
γ Cephei	76 59	+0·010	−0·68
β Ursæ Min.	74 38	+0·050	−0·74
β^2 Cephei	70 3	+0·074	−0·65
λ Draconis	69 58	+0·134	+0·15
α Draconis	64 56	+0·067	−0·14
α Ursæ Maj.	62 23	+0·140	−0·05
α Cephei	62 6	+0·050	−0·79
η Draconis	61 47	+0·238	−1·02
α Cassiopeiæ	55 54	+0·053	−0·08
γ Ursæ Maj.	54 20	+0·104	−0·63
β Draconis	52 23	+0·068	−0·81
θ Ursæ Maj.	52 12	−0·017	−0·37
γ Draconis	51 30	+0·035	−0·41
η Ursæ Maj.	49 53	+0·090	−0·51
α Persei	49 27	+0·027	−0·44
ι Ursæ Maj.	48 30	+0·084	−0·49
α Aurigæ	45 53	+0·066	+0·12
α Cygni	44 52	+0·002	−0·25
α Canum Venat.	38 57	−0·054	+0·47
α Lyræ	38 41	+0·030	−0·27
61^1 Cygni	38 11	−0·167	−0·35
β Andromedæ	+35 0	−0·003	+0·36

1885MNRAS..45..303D

Name of Star.	Approx. Dec.		Δα	Δδ
	°	′	s	″
β^1 Lyræ	+33	14	+0·002	−0·25
ι Aurigæ	32	59	+0·018	−0·43
α^2 Geminorum	32	8	+0·068	+0·14
ζ Herculis	31	49	+0·024	+0·48
ρ Boötis	30	53	+0·040	+0·54
ζ Cygni	29	45	−0·014	−0·05
β Tauri	28	30	+0·057	−0·60
α Andromedæ	28	27	+0·003	−0·04
β Geminorum	28	18	+0·030	+0·15
6 Cancri	28	7	−0·013	−0·53
μ Herculis	27	47	+0·012	−0·36
32 Vulpeculæ	27	37	−0·003	−0·11
ϵ^2 Boötis	27	34	+0·014	+0·07
ψ Boötis	27	24	+0·041	−0·11
α Coronæ	27	6	+0·046	+0·24
μ Leonis	26	33	−0·003	+0·27
16 Pegasi	25	23	+0·021	−0·10
ε Leonis	24	18	+0·051	−0·15
η Tauri	23	45	−0·018	−0·25
α Arietis	22	55	+0·002	+0·10
μ Geminorum	22	34	+0·028	−0·75
η Geminorum	22	32	+0·001	−0·07
δ Geminorum	22	11	+0·055	−0·34
γ Cancri	21	53	−0·007	−0·72
A Tauri	21	46	+0·014	−0·47
δ Leonis	21	10	+0·043	+0·07
η Cancri	20	50	−0·011	−0·44
γ^1 Leonis	20	26	+0·012	+0·42
β Arietis	20	14	−0·069	+0·14
α Boötis	19	47	+0·037	+1·00
f Boötis	19	44	+0·029	−0·15
γ Herculis	19	26	−0·005	+0·20
δ Arietis	19	17	+0·002	+0·03
η Boötis	18	59	+0·025	+0·65
ε Tauri	18	55	−0·017	+0·05
83 Cancri	18	12	−0·013	−0·21
τ Boötis	18	2	+0·005	−0·02
γ Geminorum	16	30	+0·016	−0·16
α Tauri	+16	16	+0·016	−0·04

1885MNRAS..45..303D

Name of Star.	Approx. Dec.	Δα	Δδ
	° ′	s	″
γ Tauri	+15 21	+0·014	−0·40
β Leonis	15 13	−0·003	+0·17
ε Aquilæ	14 55	−0·037	−0·05
ν Orionis	14 47	+0·003	−0·61
η Piscium	14 45	−0·023	+0·46
σ Arietis	14 36	−0·040	+0·44
α Pegasi	14 35	−0·026	+0·27
γ Pegasi	14 32	+0·004	−0·54
α^1 Herculis	14 31	+0·018	−0·24
ζ Aquilæ	13 42	−0·072	+0·48
ξ Geminorum	13 1	−0·023	−0·65
α Ophiuchi	12 39	−0·014	+0·44
α Leonis	12 32	+0·021	+0·10
α Cancri	12 18	−0·004	+0·23
ε Virginis	11 35	−0·002	+0·03
ω Aquilæ	11 23	−0·044	−0·27
l Leonis	11 9	−0·023	−0·12
κ Cancri	11 8	+0·026	−0·30
ε Delphini	10 55	−0·040	+0·86
ο Leonis	10 25	−0·019	+0·23
γ Aquilæ	10 20	+0·027	+0·02
ζ Pegasi	10 14	−0·069	−0·23
ρ Leonis	9 54	+0·029	−0·80
κ Ophiuchi	9 33	−0·042	+0·53
β Cancri	9 33	−0·004	+1·01
72 Ophiuchi	9 33	−0·022	+0·20
ε Pegasi	9 21	+0·024	−0·25
ο Tauri	8 37	+0·019	+0·08
π Leonis	8 36	−0·004	−0·58
ο Piscium	8 34	−0·018	−0·19
α Aquilæ	8 34	+0·009	−0·05
β Canis Min.	8 31	+0·007	+0·21
χ Leonis	7 58	−0·015	−0·77
ξ^2 Ceti	7 56	−0·025	−0·50
α Orionis	7 23	+0·026	−0·78
ε Piscium	7 16	+0·052	−0·46
π Virginis	7 16	+0·003	−0·97
δ Piscium	6 57	−0·058	−0·12
ε Hydræ	+6 51	+0·030	−0·30

1885MNRAS..45..303D

Name of Star.	Approx. Dec.	Δα	Δδ
	° ′	s	″
α Serpentis	+6 47	+0·015	+0·03
ω Piscium	6 13	−0·020	−0·36
β Aquilæ	6 7	−0·018	+0·47
α Canis Min.	5 31	+0·103	−1·05
ι Piscium	5 0	−0·033	−0·35
ν Piscium	4 54	−0·038	−0·62
ε Serpentis	4 50	−0·012	−0·64
β Ophiuchi	4 37	−0·014	−0·21
σ Ophiuchi	4 15	−0·010	+0·13
d Leonis	4 14	−0·039	−0·36
δ Virginis	4 2	+0·007	−0·82
α Ceti	3 38	−0·002	−0·14
τ Leonis	3 30	−0·041	+0·42
δ Aquilæ	2 53	−0·042	+0·21
γ^2 Ceti	2 45	+0·020	−0·43
γ Piscium	2 39	−0·034	−0·90
τ Virginis	2 6	−0·003	−0·65
κ Piscium	+0 37	−0·019	−0·93
ζ Virginis	0 0	+0·011	+0·09
η Virginis	−0 1	−0·034	−0·50
υ Leonis	0 11	−0·029	−0·32
δ Orionis	0 23	+0·032	−0·52
η Aquarii	0 43	−0·057	−0·97
γ^1 Virginis	0 49	+0·071	−1·58
α Aquarii	0 53	−0·061	−0·79
θ Aquarii	1 10	−0·020	−0·28
ε Orionis	1 16	−0·016	−0·53
γ Aquarii	1 58	−0·028	−0·17
η Serpentis	2 56	−0·022	+0·35
δ Ophiuchi	3 24	−0·030	0·00
μ Eridani	3 28	0·000	+0·12
12 Ceti	4 36	−0·029	−0·54
θ Virginis	4 55	−0·026	−0·48
β Aquarii	6 5	−0·049	+0·08
67 Ceti	6 57	−0·028	−0·76
o^1 Eridani	7 8	−0·053	−0·96
α Hydræ	8 9	−0·019	−0·57
λ Aquarii	8 12	−0·039	+0·26
β Orionis	−8 20	−0·014	−0·92

1885MNRAS..45..303D

Name of Star.	Approx. Dec.	Δα	Δδ
	° ′	s	″
θ Aquarii	− 8 22	−0·026	−0·94
θ Ceti	8 47	−0·051	+0·18
β Libræ	8 57	−0·027	−0·38
ι Ceti	9 28	−0·052	−1·21
κ Orionis	9 43	−0·026	−0·37
ε Eridani	9 51	+0·009	−1·07
ε Aquarii	9 55	−0·038	−0·30
ζ Ophiuchi	10 19	−0·007	−0·98
α Virginis	10 33	−0·024	−0·21
θ Canis Maj	11 54	+0·005	+0·41
α^2 Capricorni	12 54	−0·055	−0·16
γ^1 Eridani	13 50	−0·044	−0·12
δ Crateris	14 9	−0·007	−0·31
γ Canis Maj.	15 28	−0·004	+1·17
α Libræ	15 34	−0·013	−0·53
η Ophiuchi	15 35	−0·019	−0·12
δ^2 Corvi	15 52	+0·042	−0·52
μ Hydræ	16 15	−0·030	−1·12
α Canis Maj.	16 33	+0·094	+1·34
θ Capricorni	17 42	−0·006	+0·18
α Leporis	17 54	+0·050	+1·31
ρ Capricorni	18 12	−0·076	−0·09
β Ceti	18 37	−0·055	−1·09
β^1 Scorpii	19 29	−0·020	−0·94
μ Sagittarii	21 5	−0·070	−0·11
ε Corvi	21 58	+0·026	−1·11
ε Leporis	22 32	−0·057	−1·11
β Corvi	22 45	−0·094	−0·84
15 Argûs	23 58	+0·017	−0·78
ξ Argûs	24 34	+0·016	−2·39
θ Ophiuchi	24 53	−0·013	+0·34
h^2 Sagittarii	25 8	−0·098	−0·40
λ Sagittarii	25 29	−0·005	−2·49
α Scorpii	26 10	+0·005	−0·01
δ Sculptoris	28 46	−0·028	−0·13
ε Canis Maj.	28 49	+0·016	−0·32
α Piscis Aust.	−30 14	−0·054	−0·81

The stars have been combined in convenient groups, omitting, for the R.A.'s, those within 13° of the Pole, and for both co-

1885MNRAS..45..303D

ordinates *Procyon*, *Sirius*, γ *Virginis*, and 61 *Cygni*. The mean $\Delta\alpha$'s and $\Delta\delta$'s have then been graphically represented, and curves drawn through them, from which can be read off the differences corresponding to any declination between the extreme limits. The table gives the mean differences and the corresponding quantities as read off from the curves.

Mean Dec.	Mean $\Delta\alpha$	Mean $\Delta\delta$	Number of Stars.	From Curves. $\Delta\alpha$	From Curves. $\Delta\delta$
° ′	s	″		s	″
+87 52		−0·22	4		
80 12		− ·45	2		−0·41
72 55	+0·067	− ·48	4		− ·48
62 48	+ ·124	− ·50	4	+0·074	− ·49
53 16	+ ·049	− ·46	5	+ ·059	− ·44
47 43	+ ·054	− ·31	5	+ ·043	− ·24
34 13	+ ·016	+ ·13	8	+ ·026	− ·04
27 43	+ ·016	− ·10	12	+ ·015	− ·05
22 3	+ ·009	− ·21	12	+ ·012	− ·07
18 31	+ ·010	+ ·14	10	+ ·004	+ ·02
13 22	− ·014	+ ·02	19	− ·005	·00
8 26	− ·002	− ·18	21	− ·009	− ·16
+ 4 7	− ·018	− ·28	15	− ·015	− ·28
− 1 37	− ·022	− ·36	15	− ·023	− ·37
9 9	− ·029	− ·46	17	− ·027	− ·41
18 33	− ·024	− ·33	16	−0·024	−0·48
−26 27	−0·016	−0·78	9		

The next table gives the differences $\Delta\alpha$ and $\Delta\delta$, read off from the curves for every 5° from Declination +85° to −25° for $\Delta\delta$, and from +70° to −25° for $\Delta\alpha$.

Dec.	$\Delta\alpha$	$\Delta\delta$	Dec.	$\Delta\alpha$	$\Delta\delta$
°	s	″	°	s	″
+85		−0·29	+30	+0·017	−0·03
80		− ·41	25	+ ·013	− ·07
75		− ·46	20	+ ·009	·00
70	+0·070	− ·48	15	− ·003	+ ·01
65	+ ·074	− ·49	10	− ·008	− ·09
60	+ ·072	− ·48	+ 5	− ·013	− ·22
55	+ ·063	− ·45	0	− ·022	− ·37
50	+ ·050	− ·33	− 5	− ·027	− ·40
45	+ ·040	− ·20	10	− ·028	− ·41
40	+ ·032	− ·12	15	− ·027	− ·44
+35	+0·026	−0·05	20	− ·023	− ·50
			−25	−0·018	−0·62

1885MNRAS..45..303D

These corrections with reversed signs have been applied to the $\Delta\alpha$ and $\Delta\delta$ for every star, excepting the four mentioned above, situated between Dec. $+50^\circ$ and -25°; and it is considered that the outstanding differences are those depending on R.A. The stars have therefore been arranged in order of R.A. and combined in groups of 1^h each, and by a graphical representation of the mean differences, similar to that explained above, we obtain from the two curves which have been drawn the values of $\Delta\alpha$ and $\Delta\delta$, corresponding to the mean R.A. of each group here given:—

Mean R.A.	Mean $\Delta\alpha$	Mean $\Delta\delta$	Number of Stars.	From Curves.	
				$\Delta\alpha$	$\Delta\delta$
h m	s	″		s	″
0 26	−0·007	−0·33	7	−0·014	−0·21
1 28	− ·030	+ ·19	6	− ·018	+ ·01
2 29	− ·001	− ·01	6	− ·009	+ ·01
3 31	− ·001	− ·12	7	·000	− ·11
4 27	+ ·002	− ·15	6	+ ·007	− ·12
5 24	+ ·024	− ·04	9	+ ·015	− ·05
6 29	+ ·009	+ ·05	7	+ ·017	− ·06
7 33	+ ·022	− ·30	6	+ ·017	− ·15
8 31	+ ·012	− ·04	7	+ ·013	− ·12
9 30	+ ·006	− ·08	7	+ ·007	− ·09
10 31	+ ·003	− ·13	7	+ ·005	− ·08
11 29	+ ·006	+ ·06	6	+ ·003	− ·04
12 32	− ·004	− ·14	7	+ ·004	− ·03
13 35	+ ·017	+ ·10	7	+ ·013	+ ·08
14 34	+ ·019	+ ·24	6	+ ·017	+ ·14
15 37	+ ·013	− ·05	5	+ ·011	+ ·10
16 29	− ·004	+ ·23	5	+ ·003	+ ·17
17 23	+ ·006	+ ·26	7	− ·002	+ ·16
18 25	− ·015	− ·12	7	− ·012	+ ·07
19 27	− ·023	+ ·26	7	− ·020	+ ·18
20 32	− ·019	+ ·29	8	− ·019	+ ·21
21 36	− ·012	− ·02	5	− ·017	+ ·06
22 33	− ·023	− ·02	6	− ·017	− ·11
23 30	−0·009	−0·36	4	−0·012	−0·27

By reading off from the curves for the beginning of each hour we have the following systematic discordances in R.A. and Dec. depending on Right Ascension:—

1885MNRAS..45..303D

R.A.	$\Delta\alpha_\alpha$	$\Delta\delta_\alpha$	R.A.	$\Delta\alpha_\alpha$	$\Delta\delta$
h m	s	″	h m	s	″
0 0	−0·013	−0·24	12 0	+0·004	−0·03
1 0	− ·017	− ·10	13 0	+ ·008	− ·01
2 0	− ·013	+ ·01	14 0	+ ·016	+ ·11
3 0	− ·004	− ·04	15 0	+ ·015	+ ·14
4 0	+ ·004	− ·12	16 0	+ ·008	+ ·12
5 0	+ ·012	− ·08	17 0	− ·001	+ ·17
6 0	+ ·017	− ·05	18 0	− ·007	+ ·09
7 0	+ ·017	− ·11	19 0	− ·017	+ ·13
8 0	+ ·015	− ·13	20 0	− ·019	+ ·20
9 0	+ ·009	− ·09	21 0	− ·018	+ ·17
10 0	+ ·006	− ·08	22 0	− ·017	− ·01
11 0	+0·004	−0·07	23 0	−0·014	−0·18

The differences in the last table have then been applied, with reversed signs, to the $\Delta\alpha$ and $\Delta\delta$ of each star, arranged in order of Declination, which has been used in forming the first approximation to the systematic discordances depending on Declination. The residuals may be considered to be free from discordances depending on R.A., and being treated exactly as before, give the second approximation to the values of the systematic discordances depending on Declination. This table gives the resulting mean differences and the corresponding quantities read off from the curves.

Mean Dec.	Mean $\Delta\alpha$	Mean $\Delta\delta$	Number of Stars.	From Curves. $\Delta\alpha$	$\Delta\delta$
° ′	s	″		s	
+87 52		−0·18	4		
80 12		− ·57	2		−0·45
72 55	+0·070	− ·47	4		− ·52
62 48	+ ·122	− ·57	4	+ ·073	− ·51
53 16	+ ·053	− ·43	5	+ ·061	− ·44
47 43	+ ·051	− ·31	5	+ ·043	− ·24
34 13	+ ·016	+ ·11	8	+ ·025	− ·06
27 43	+ ·015	− ·12	12	+ ·013	− ·07
22 3	+ ·004	− ·14	12	+ ·006	− ·07
18 31	·000	+ ·13	10	− ·002	+ ·04
13 22	− ·011	+ ·04	19	− ·006	+ ·02
8 26	·000	− ·15	21	− ·007	− ·14
+ 4 7	− ·013	− ·27	15	− ·012	− ·26
− 1 37	− ·018	− ·32	15	− ·020	− ·35
9 9	− ·027	− ·45	17	− ·025	− ·39
18 33	− ·026	− ·33	16	−0·024	−0·47
−26 27	−0·015	−0·75	9		

1885MNRAS..45..303D

The following table gives the adopted systematic discordances in R.A. and Declination depending on Declination. As this second approximation differs so little from the first, it was not considered necessary to proceed to a further approximation.

Dec.	$\Delta\alpha_\delta$	$\Delta\delta_\delta$	Dec.	$\Delta\alpha_\delta$	$\Delta\delta_\delta$
°	s	″	°	s	″
+85		−0·28	+30	+0·017	−0·06
80		− ·46	25	+ ·010	− ·07
75		− ·52	20	+ ·001	− ·05
70	+0·072	− ·53	15	− ·006	+ ·03
65	+ ·073	− ·53	10	− ·007	− ·09
60	+ ·071	− ·50	+ 5	− ·010	− ·22
55	+ ·063	− ·47	0	− ·018	− ·33
50	+ ·050	− ·32	− 5	− ·023	− ·38
45	+ ·038	− ·20	10	− ·026	− ·40
40	+ ·031	− ·11	15	− ·026	− ·42
+35	+0·026	−0·07	20	− ·024	− ·50
			−25	−0·018	−0·62

The total systematic discordance for any star is therefore found from the last table and the last but two by a proper combination of the quantities $\Delta\alpha_\alpha$ and $\Delta\alpha_\delta$ for R.A., and $\Delta\delta_\alpha$ and $\Delta\delta_\delta$ for Declination; the sum of the discordance depending on R.A. and of the discordance depending on Declination forming, of course, the total discordance. It must, however, be borne in mind that there are but few stars in the several groups from which these systematic discordances are derived, and that therefore they must not be considered as entitled to entire confidence.

On pp. 90, 91 of Dr. Auwers' paper, which forms a Supplement to the *Berliner Jahrbuch* for 1884, he gives the corrections to reduce the systems of the *Nautical Almanac* (1883), the *American Ephemeris*, and the *Connaissance des Temps* to that of the *Berliner Jahrbuch*. By making use of these tables we have the following systematic corrections to the *Berliner Jahrbuch*, the *American Ephemeris*, and the *Connaissance des Temps* respectively, to reduce them to the system of the *Nautical Almanac* for 1884.

Corrections depending on Declination.

Dec.	*Berliner Jahrbuch.*		*American Ephemeris.*		*Conn. des Temps.*	
°		″		″		″
+75		−0·73		−0·69		−0·80
	s		s		s	
70	−0·049	− ·61	+0·015	− ·58	−0·133	− ·59
65	− ·062	− ·47	− ·028	− ·44	− ·121	− ·36
60	− ·071	− ·36	− ·059	− ·32	− ·101	− ·12

1885MNRAS..45..303D

Dec.	*Berliner Jahrbuch.*		*American Ephemeris.*		*Conn. des Temps.*	
°	s	″	s	″	s	″
55	− ·075	− ·22	− ·074	− ·16	− ·076	+ ·07
50	− ·073	− ·20	− ·081	− ·09	− ·068	− ·04
45	− ·068	− ·10	− ·083	+ ·05	+ ·010	− ·30
40	− ·068	− ·02	− ·088	+ ·13	+ ·026	− ·27
35	− ·062	+ ·04	− ·083	+ ·18	+ ·019	− ·06
30	− ·042	+ ·02	− ·058	+ ·11	+ ·012	− ·10
25	− ·021	− ·07	− ·032	− ·06	+ ·022	− ·26
20	− ·015	+ ·13	− ·027	+ ·07	+ ·029	− ·22
15	− ·015	+ ·04	− ·031	− ·06	+ ·032	− ·46
10	− ·017	− ·17	− ·037	− ·22	+ ·012	− ·62
+ 5	− ·013	− ·10	− ·036	− ·20	+ ·001	− ·36
0	− ·012	+ ·08	− ·032	− ·12	+ ·001	− ·12
− 5	− ·017	+ ·27	− ·033	+ ·02	·000	+ ·06
10	− ·018	+ ·44	− ·035	+ ·14	+ ·002	+ ·08
15	− ·020	+ ·62	− ·039	+ ·25	+ ·003	+ ·02
20	− ·021	+ 0·86	− ·040	+ ·34	− ·001	+ ·09
− 25	− 0·020	+ 1·11	− 0·037	+ 0·50	− 0·011	+ 0·36

Corrections depending on Right Ascension.

R.A.		*Berliner Jahrbuch.*		*American Ephemeris.*		*Conn. des Temps.*	
h	m	s	″	s	″	s	″
0	0	− 0·025	+ 0·25	− 0·023	+ 0·20	+ 0·011	+ 0·11
1	0	− ·012	+ ·05	− ·011	+ ·08	+ ·017	+ ·01
2	0	− ·004	− ·12	− ·003	− ·10	+ ·013	− ·07
3	0	− ·002	− ·10	·000	− ·16	− ·005	− ·01
4	0	+ ·005	− ·08	+ ·009	− ·23	− ·027	+ ·07
5	0	+ ·008	− ·17	+ ·012	− ·31	− ·043	+ ·05
6	0	+ ·012	− ·25	+ ·012	− ·27	− ·042	+ ·06
7	0	+ ·012	− ·23	+ ·009	− ·19	− ·030	+ ·14
8	0	− ·002	− ·26	− ·004	− ·27	− ·022	+ ·13
9	0	− ·025	− ·31	− ·024	− ·31	− ·034	+ ·07
10	0	− ·023	− ·28	− ·019	− ·23	− ·033	+ ·09
11	0	− ·003	− ·19	+ ·001	− ·07	− ·020	+ ·15
12	0	+ ·016	− ·11	+ ·015	+ ·08	− ·010	+ ·17
13	0	+ ·022	+ ·02	+ ·018	+ ·24	− ·005	+ ·18
14	0	+ ·016	+ ·09	+ ·009	+ ·25	− ·007	+ ·10
15	0	+ ·010	+ ·21	+ ·002	+ ·20	− ·005	+ ·01
16	0	+ ·006	+ ·41	·000	+ ·32	+ ·003	− ·22
17	0	+ ·001	+ ·43	·000	+ ·35	+ ·009	− ·17

1885MNRAS..45..303D

R.A.		*Berliner Jahrbuch.*		*American Ephemeris.*		*Conn. des Temps.*	
h	m	s	″	s	″	s	″
18	0	− ·010	+ ·51	− ·006	+ ·50	+ ·010	+ ·02
19	0	− ·019	+ ·34	− ·016	+ ·34	+ ·010	− ·04
20	0	− ·029	+ ·13	− ·029	+ ·07	+ ·006	− ·20
21	0	− ·035	+ ·06	− ·037	− ·04	+ ·004	− ·23
22	0	− ·036	+ ·16	− ·038	+ ·05	+ ·004	− ·10
23	0	−0·032	+0·25	−0·032	+0·15	+0·007	+0·03

On examining the comparison of the places of individual stars given above (in the first table) it will be seen that there are several cases of abnormal discordance which are not covered by the systematic corrections which have been deduced. The great majority of these appear to arise from inaccuracies in the proper motions adopted in bringing up the places of the stars from the epochs of the catalogues on which their places depend. And if we substitute what must be considered to be more accurate values of the proper motions for those adopted, we find that the abnormal discordances, in almost every instance, are reduced within ordinary limits. Thus, if we confine our attention to the R.A.'s of the Greenwich clock-stars given in the *Nautical Almanacs* for 1883 and 1884 (as these are the most important cases), and if we consider a discordance amounting to 0$^{\text{s}}$·05 to be an abnormal discordance, we find that there are 24 of these stars whose R.A.'s differ by more than this quantity. Now the adopted proper motions of the great majority of the *Nautical Almanac* stars are taken from Main's and Stone's determinations of proper motions of the stars in Airy's earlier Greenwich Catalogues by comparing their places in those catalogues with Bessel's reduction of Bradley. If for these adopted proper motions we substitute those determined by Auwers from a comparison of his re-reduction of Bradley with modern observations, we get a set of proper motions founded on more accurate ancient places, and with a longer interval for their determination; it would appear, therefore, that they must needs be more accurate. The epoch of the catalogue on which the star places of the *Nautical Almanac* for 1884 are founded is 1872; that on which the *Nautical Almanac* for 1883 depends is some ten years earlier; if, therefore, we apply the correction 10 (Auwers' proper motion − Greenwich proper motion) to the differences *Nautical Almanac* 1883 − *Nautical Almanac* 1884, we correct roughly for errors in the assumed proper motions. Auwers' proper motions have been extracted from *Publicationen der Astronomischen Gesellschaft*, Nos. xiv. and xvii., and the Greenwich values from the Nine-Year Catalogue. The quantities in the column "uncorrected" are the actual discordances; those in the column "corrected" are the outstanding discordances after the application of the correction to the assumed proper motion.

1885MNRAS..45..303D

Name of Star.	Δα	
	Uncorrected.	Corrected.
	s	s
ι Ceti	−0·052	−0·024
β Ceti	− ·055	− ·038
δ Piscium	− ·058	− ·053
ε Piscium	+ ·052	+ ·002
θ Ceti	− ·051	− ·049
β Arietis	− ·069	− ·039
o' Eridani	− ·053	− ·037
ε Leporis	− ·057	− ·063
β Tauri	+ ·057	+ ·040
α Leporis	+ ·050	+ ·029
δ Geminorum	+ ·055	+ ·030
α² Geminorum	+ ·068	+ ·047
α Canis Min.	+ ·103	+ ·031
ε Leonis	+ ·051	+ ·048
β Corvi	− ·094	− ·047
μ Sagittarii	− ·070	− ·044
ζ Aquilæ	− ·072	− ·038
h² Sagittarii	− ·098	− ·102
α² Capricorni	− ·055	− ·043
ρ Capricorni	− ·076	− ·044
α Aquarii	− ·061	− ·039
η Aquarii	− ·057	− ·045
ζ Pegasi	− ·069	− ·035
α Piscis Aust.	−0·054	−0·042

In the case of *α Canis Minoris*, Auwers' periodical corrections have been applied in forming "Δα corrected." It thus appears that in every case except two the discordances are diminished by the application of the correction, and the mean discordance without regard to sign for these 24 stars is reduced from $0^s{\cdot}064$ to $0^s{\cdot}042$. This appears to me to demonstrate the superiority of Auwers' proper motions, and to show how desirable it is that they, or others equally accurate, should be adopted in this country.

I may also point out that the great majority of cases of discordance in the places of individual stars which Dr. Auwers finds in his comparison of the *Berliner Jahrbuch* for 1883 with the *Nautical Almanac* for the same year (contained in the Supplement to the *Berliner Jahrbuch* for 1884 referred to above) would have disappeared if the comparison had been made for 1884 instead of for 1883. In fact, by choosing the year 1883—the first in which the *Jahrbuch* uses the Catalogue of the

1885MNRAS..45..303D

Astronomische Gesellschaft, and the last in which the *Nautical Almanac* uses the Seven-Year Catalogues—Dr. Auwers has taken the most favourable case for the *Berliner Jahrbuch* and the most unfavourable for the *Nautical Almanac*. The comparison would have been more impartial and more useful if 1884 had been the year selected.

Notes and Corrections to Sir John Herschel's Synopsis of all Sir William Herschel's Measures. By Herbert Sadler.

The following notes and corrections to Sir John Herschel's "Synopsis of all Sir William Herschel's Micrometrical Measurements, &c," published in volume xxxv. of the *Memoirs*, may be considered as supplementary to those already published by Sir John Herschel in *Monthly Notices*, vol. xxviii. p. 151, and by Mr. Burnham in vol. xxxiii. p. 567, and vol. xxxiv. p. 98. These, or other notes by Mr. Burnham in the *Monthly Notices* or *Memoirs*, have not been referred to in the present paper, except in one or two cases where obvious misprints in them have been corrected. The original MSS. of Sir William and Miss Caroline Herschel have been most carefully compared with the printed catalogues in the *Philosophical Transactions*, and both of these authorities with the Synopsis itself; and in this revision many errors which had escaped previous notice have been discovered and corrected. The general tenor of these corrections is to show, even more strikingly than before, the marvellous accordance of Sir William Herschel's measures (made with a 6⅓-inch mirror roughly mounted in the open air, and with rude micrometrical appliances) with the best results of modern instruments, furnished with excellent micrometers, and driven by clockwork.

Many of the identifications have been made with the aid of the 3¼-inch Sheepshanks instrument belonging to the Society, and have in all cases been indicated as concisely as possible.

All the stars in the first three classes, with one exception (that of III. 31), have now been identified. Of those which still remain unidentified, three have been measured in position-angle, five in distance, and four only in both coordinates. The position-angles or distances of only a few of the remainder have even been estimated.

Class I.

No.

1. Column 5: *for* 1779·687 *read* 1779·816, *for* 1802·019 *read* 1802·074. Column 6: *for* 297° *read* 297° est. Columns 9 and 10: *add* 1779·747, 1″·667; 1780·309, 4″·062— : 1780·320, 2″·968.

3. Column 12: *add* W^{r}. 243.

4. Column 12: "Called by H. 16 *Draconis*." ♅, however, calls the star 17, *not* 16, *Draconis* in the observation of 1802·827.

7. Column 6: *for* 26°·63 *read* 26°·09.